

THE DISTRIBUTION
AND
SPREAD OF SLEEPING SICKNESS
IN THE
CONGO FREE STATE
WITH
SUGGESTIONS ON PROPHYLAXIS*

*Being the Fourth Progress Report from the Expedition of the Liverpool
School of Tropical Medicine to the Congo, 1903-05*

BY THE LATE

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The paper treats of the distribution and spread of "sleeping sickness" in the Congo Free State, and it proposes measures designed to prevent the extension of the disease to districts as yet uninfected. The results here presented are a part of the work done by the Expedition sent from the Liverpool School of Tropical Medicine to the Congo Free State in 1903.

It will be well to commence by specifying the sources from which was obtained the information on which this communication is based; they were as follows:—

1. *Personal observation.*—Only a small part of our facts was obtained by personal observation. Twenty-three months were spent in the Congo, and during that time we travelled some 2,000 miles. The route followed is shown on the accompanying maps. It is noticed that several short journeys of from one to seven days' duration were made off the main line of travel. The conditions obtaining were carefully noted in each locality visited, and residents—missionaries, state officials and natives—were thoroughly questioned. It was only after passing Coquilhatville that gland palpation and puncture were employed and, as will be shown later on, permitted us to form a really accurate idea of the percentage of natives infected with trypanosomes.

2. *Circular letters.*—In October, 1903, the Free State Government sent out for us a circular letter of questions concerning "sleeping sickness" to its officials and to missionaries throughout the Congo. A second series of these letters was sent out early in 1905.

* This paper was read before the Epidemiological Society at London on October 17th, 1905. It is reproduced here, with some additions, by the kind permission of that body.



3. *Medical Report.*—In 1897 Drs. Bourguignon, Cornet, Drypondt, Firket, Lancaster and Meulman presented at Brussels to the "Congres National d'Hygiène et de Climatologie Medicale" a volume in which they reported on the occurrence of disease in the posts established at that time in the territory of the Free State. Their information, like our own, was in part obtained by personal observation and in part from answers to circular letters of questions which they had caused to be sent to the State's agents.

The greatest part of the information embodied in this paper has, therefore, been collected through questioning natives and more or less observant Europeans. As might be expected the answers have not always agreed, and it has occasionally been necessary to ignore particularly improbable statements; but on the whole there has not been any very great divergence of opinion, and the general result as here given was inevitably arrived at after a short study of our notes. There was, indeed, among many hundreds, scarcely half a dozen answers absolutely incompatible with the general conclusions presented in this paper.

For this reason alone, although the many dangers hidden in evidence so collected are known to us, we think that the history of the spread of "sleeping sickness" in the Congo Free State as given below recounts very nearly what has actually taken place.

Distribution.

The present (1905) distribution of "sleeping sickness" in the Congo Free State is shown on Map III.* In this, as in the other maps, areas where "sleeping sickness" is endemic are stippled with red dots. No information was obtained concerning certain unexplored or unsettled districts. These are roughly shown by crossed lines. With these possible exceptions it is believed that practically every locality in the Free State has been noted at which cases of "sleeping sickness" occurred before the middle of 1905.

In many localities the presence of "sleeping sickness" has remained for a time unknown to the resident Europeans; and even to the natives themselves. In others, although the disease is seen to be present, its nature remains unrecognised. Errors from both these causes have undoubtedly occurred in the reports sent to us, and cases of "sleeping sickness" may possibly in reality occur amongst the natives in districts off our line of travel marked as uninfected. As has already been said, much of the information incorporated in this paper has been derived from questioning many hundreds of persons. It is therefore believed that no very grave error can exist.

* See page 32.

Predisposing Causes.

As is usual, peoples living along the banks of large bodies of water have suffered the most heavily. Tribes living even a short distance inland from the rivers have often remained comparatively immune, although the neighbouring riverine peoples were much infected.

Upoto and Lokandu illustrate this point. At these places about 25 per cent. of the river people are infected. At Upoto 225 persons from two hours further inland, who had been settled for two years in villages only a mile and a half from the river, were examined. Not one was infected. At Lokandu 224 inhabitants of villages situated from 10 to 15 miles from the river were examined, 3 were found to be infected. All three had been exposed to infection by living for some time in districts where "sleeping sickness" was epidemic.

As is suggested by these instances, the disease seems to spread but slowly from an infective centre.

Isolated cases of "sleeping sickness" occurred among the Bobangi, riverside people, at Tschumbiri before the arrival of Europeans in the Congo. In 1893 these people suffered very severely from the disease; but it was only in 1901 that the first cases were noticed amongst the Bateke, who live only a short two miles inland. *Glossina palpalis* was seen to be present at Tschumbiri and Lokandu.

We have been told that "sleeping sickness" was caused by eating manioc, through lack of salt, smoking hemp, drinking palm wine, or by excessive coitus, and that it might be contracted through using drinking utensils employed by infected persons or through coitus with them. All of these statements seem mistaken. In an infected population all classes, male and female, adults and children, are equally susceptible. (By gland palpation and puncture trypanosomes were found in a baby less than nine months old.)

Famine and hard times are said to induce "sleeping sickness."

Lukolela and the country of the Batetelas are cited as examples. The Batetelas had suffered depredations from the Arabs. They were disturbed by the war between whites and Arabs in '92-94, ravaged by revolted soldiers in '95-96, and oppressed by a native chief until a few years ago. Food became scarce, and at present "sleeping sickness," previously unknown among them, is spreading very rapidly in their country. Occasional cases of "sleeping sickness" had occurred at Lukolela before 1880. After a small war with the Government in 1896 the crops were lost. Food became scanty and of poor quality and cases of "sleeping sickness" were much more frequently seen amongst the resident natives.

From the analogy of trypanosome-caused diseases in animals it does not seem improbable that unfavourable conditions might decide a declaration of the disease in persons already infected. Apart from this, and excepting always the susceptibility of fishing and river-side peoples, no peculiarity or tribal custom has been observed to predispose natives to "sleeping sickness." Villages placed on high ground and at some distance from even a small stream of water have, however, occasionally be found to be heavily infected.

For instance, Palabala (near Matadi) is situated at the top of a high hill and is at least 10 minutes' walk from a stream, yet it has suffered severely from sleeping sickness. The conditions

are much the same at Cabinda, a large compact town, yet 13 per cent. of its population is infected. At Miambwé the native village is much spread out over a cultivated, upland plain in groups of two to five houses. Each group contains a single family of perhaps five to a dozen persons. When we passed at the commencement of the dry season there was almost no water in the water-course distant half-a-mile from the nearest of the houses. There was no scrub or bush in the neighbourhood, and even in the wet season no marsh would exist near any of the houses. Nevertheless about 7 per cent. of the population was infected. A similar observation was made at other villages in this locality.

Glossina palpalis was found practically everywhere along our route. At many places in the grass country, as at Miambwé, they were extremely rare and an hour's search at midday in the most probable places along wooded streams more than once resulted in a failure to see a single tse-tse of any species.

It may be that the flies become more numerous in the rainy season; otherwise, in spite of the great chronicity of human trypanosomiasis, it would seem impossible for them in these localities to be altogether responsible for the large numbers of persons actually infected with trypanosomes.

It is certain that the annual percentages of deaths from "sleeping sickness" in an infected population may vary greatly. In partial explanation it is often plausibly stated that declared cases are most numerous during inclement seasons. It may be so, but there are also probably variations in mortality among an infected population quite independent of seasonal influences or famine or the number of *Glossinæ*. In some localities the intensity of the disease seems to be lessening.

In 1886 cases of "sleeping sickness" were very numerous in the Lower Congo. Many of the missionaries living there, some of them residents of 25 years' standing, state that the percentage of deaths from "sleeping sickness" is much less now than then. (In some cases their opinion is verified by the mission books in which the dates and causes of deaths of *church members only* are entered.) Nowhere in the Congo, outside of the district of the Cataracts on the lower river did we hear from natives or Europeans any trustworthy history of a former increase in the number of cases of "sleeping sickness" similar to the present exacerbation. Only at Lukolela did the natives have a vague tradition of a former epidemic.

Spread.

In order to obtain a graphic representation of the spread of "sleeping sickness" in the Congo, maps have been prepared which show the approximate distribution of the disease at three points of time—1884, 1897, 1905. The same maps roughly indicate the main lines of communication employed during the years immediately preceding each date.

1884, Map I.

In 1884, Europeans had no influence in the Congo basin. The Free State was not yet established. The whole of the Eastern province was controlled by Zanzibaris who, through their allies and lieutenants, ruled Central Africa and exacted tribute from Avakubi to Cabinda. The slaves and ivory for which they exploited the country were taken out by the waterways and over well-

defined trade routes. Practically speaking, they never got further down the Congo or Aruwimi than Basoko, where the Free State placed a military camp in 1888 to stop their advance. Nor did they establish themselves far to the West of the Congo. They had, however, a powerful ally in this district in Gongo Lutete, a native chief living at Gandu. Through him they constantly obtained slaves from as far West as Lusambo. In addition Arab caravans were sent from Kasongo to Lusambo to purchase slaves and native-made ironware. It is to be noticed that none of the Arab routes touched districts infected at that time with "sleeping sickness."

The natives themselves had well recognised trade routes over which merchandise passed. On some routes the goods were passed on from tribe to tribe. On others, caravans carried produce or slaves to market many days away.

For instance salt from Nyangwé and cloth and powder from the Portuguese west coast found their way to Pania Mutombo and Luluabourg. These goods were bartered from hand to hand, and those who bought and sold never went long distances to find markets. There was at Tschimbango an important local exchange to which came people from Pania Mutombo, Luebo, Lusambo and Luluabourg—rarely anyone from further away.

The roads along which went tribe-to-tribe traffic are indicated by dotted red lines. Routes where traders travelled long distances by canoe or caravan are marked by unbroken lines.

Perhaps the longest journeys were made by the tribes living along the Congo between Tshumbiri and Nouvelle Anvers. These people regularly took slaves from the Ubangi and from above the equator to Leopoldville, where they were sold to native traders from the neighbourhood of Lutete (Wathen) to be resold later in Portuguese territory at San Salvador. Another long native transport route is from Lake Kasali to Cabinda (a journey of 20 days' walk). To this day caravans of 100 to 200 persons come monthly to Cabinda with dried fish. They formerly brought, as well, salt from Kiambi.

Traders from the Upper Congo frequently went as far as Wathen with their slaves. "Sleeping sickness" has existed for probably more than fifty years at Wathen, and it seems probable that this constant stream of travellers may well have carried "sleeping sickness" back with them to their homes as high up the river as midway between Nouvelle Anvers and Upoto.

There was a brisk village-to-village commerce among the natives along the upper river in salt, fish, cam-wood powder, slaves and iron tools. Such a means of communication easily explains a short additional extension of the disease to Bumba, the highest point at which "sleeping sickness" was known before the arrival of the Europeans. This statement implies that "sleeping sickness" was unknown above Bumba in 1884. In making it we rely upon the evidence of Europeans who have lived for many years in the locality, and upon the reports given by natives. No district in which "sleeping sickness" has once existed is

known to have ever become entirely free from the disease. Cases may become more rare but they do occur, and the natives always know and have a name for the disease. In many places along the Upper Congo between Basoko and Kasongo the disease is, or was until recently, quite unknown, and the natives either coin a new word to describe it or use the Kisuaheli name.

Some tribes acted as professional middlemen and carriers and controlled the commerce from the interior of the Coast. For example, the Bakiokos and other tribes from Portuguese territory regularly traversed the southern and western part of the Free State, and even went as far as Pania Mutombo where they exchanged cloth and powder for slaves. They had no regular posts or agents who collected slaves for them; but as they went inland trustworthy men were left in friendly villages with goods and orders to buy slaves. As the caravan returned westward each of these headmen was picked up with his little gang of slaves. Because their wants were supplied by these middlemen none of Pania's people ever traded far to the West and no long distance trading was done down the Kasai. We believe that it is for these reasons alone that "sleeping sickness" remained quite unknown to the natives about Lusambo until 1896. There was no constant, intimate and direct communication with infected districts.

The main routes used by the traders from Portuguese territory are marked with a "P."

Near Lake Leopold II. is a village marked with a query. Its chief asserts that "sleeping sickness" existed there before Europeans appeared in the country. It is probable that he is wrong since white men saw no cases in the district when they first entered it, nor were cases reported from that locality until much later. If he is right "sleeping sickness" had possibly a much wider distribution in 1884 than we suspect.

1897, Map II.

In 1885 the Free State was founded. Steamers were put on the river and transport by the great waterways commenced to be rapid and easy. In 1888 the first step was taken towards suppressing the slave trade. The campaign to limit the power of the Arab raiders was opened by the establishment at Basoko and at Lusambo (1889) of fortified camps. At the same time expeditions were sent in all directions to explore and open up the country, so it was not until 1892 that the war really commenced which, in 1894 at Nyangwé, resulted in the complete destruction of the Arab power. These large movements involved a journeying of men previously unknown in the Congo. Natives came from so far as the neighbourhood of Bandundu to carry loads over the caravan route

from Matadi to Leopoldville. Soldiers and labourers employed on the Upper River often came from the infected lower Congo.

The main movement against the Arabs went overland from Lusambo to Kasongo. Through Lusambo passed, until the mutiny of 1895-96, the whole of the transport from the West to the Great Lakes and to the South of the Free State. In this way large numbers of persons from infected districts entered these hitherto uninfected regions.

In 1896 the first recognised case of "sleeping sickness" occurred at Pania Mutombo. The date is given with great unanimity by natives of all the surrounding tribes. From this centre the disease has rapidly spread in all directions, but, in particular, along the much-used caravan route between Lusambo and Kasongo. Until 1901, save for an interruption in 1895-96 caused by a mutiny of soldiers, this road was in constant use. It was the line of communication from the Lower Congo with all the Eastern part of the Free State. Along it there was much transport of supplies, produce, and comparatively large numbers of soldiers. The route was frequently used by natives who, for example, carried taxes to Kasongo from places as far off as Cabinda.

About 1894 labourers were first engaged from about Pania Mutombo to work in the Lower Congo. When their term of engagement was ended they returned, with many time expired soldiers, to settle rich men in their old homes about Lusambo. Their presence doubtless added many new centres of infection. We have been told that they frequently died, shortly after their return, from "sleeping sickness."

The extension of "sleeping sickness" has been more rapid to the East of Lusambo towards Kasongo than to the South towards Cabinda. This is to be explained by the fact that the country to the East of Lusambo has been more influenced by the changes of recent years. The transport through this region was the larger; it had been twice fought over; more natives have been engaged to work in other parts of the Free State from this region than from the districts to the South of Cabinda.

The waterways supplied an excellent means of transport which permitted the Free State to pursue its policy of reaching the heads of the rivers in order to effectively occupy the whole of the Congo Basin. One result of this policy is well seen at the present day in the distribution of "sleeping sickness" along the Kasai River. The natives on either bank of its middle reaches had but little to do with strangers, and even to-day, save at Manghay where there is a very old-established plantation to which labourers are said to have been brought from all parts of the Congo, there is little or no "sleeping sickness" along the

middle part of the river. At its mouth and at the limit of navigation cases are numerous.

During the mutiny of 1895-96 the caravan route from Lusambo to Kasongo was closed and transport to the Lake region went by way of Stanley Falls all the way up the Congo to Kasongo. This is the route used at present for all the traffic from the West to the country lying to the East of the Congo, North of 5° and South of 1° S. The extension of "sleeping sickness" which followed the subsequent increase of transport along this old highway of the Arabs is very evident on comparing the maps showing the distribution of the disease in 1897 and 1905.

The present severe epidemic commenced at Kasongo at about 1900-1901, since then "sleeping sickness" has spread steadily down the Congo as well as up. From Kasongo the disease extended with terrible severity along the much-travelled transport routes which lead to Lake Tanganyika and the district about Lake Kivu. It is still spreading rapidly. At the commencement of 1905 the disease was confined fairly well to the natives living on either side of the caravan route. Occasional imported cases alone were reported from posts to the South on the shores of Tanganyika and inland. Letters received since the return of the Expedition to Europe say that cases are commencing to be seen among the natives resident in this region.

Map IV. gives the dates at which the present epidemic of "sleeping sickness" is usually accepted to have made its appearance in the localities indicated.

It is interesting to note that the villages (Kirunda and Kama) most infected along the lower part of the river between Stanleyville and Kasongo are inhabited by Arabised natives who do a great deal of trading. At this moment they journey particularly between Stanleyville and Maniema, the latter a *heavily infected district*. There can be no doubt that this constant native traffic has contributed largely to the extension of "sleeping sickness" along the Congo to the north of Kasongo. Natives, as in the villages opposite Ponthierville, who do no travelling have remained uninfected. It is not without interest to note that one of the first cases of "sleeping sickness" seen at Kaya was a Zanzibarite who had settled there 10 years previously and had come into the Congo by way of Uganda.

Even if all these dates are granted to be correct, and if it is assumed that "sleeping sickness" did follow the entrance of persons from the infected Lower Congo into the Kasai and Maniema, it may still be protested that these events do not stand to one another in the relation of effect and cause. It is, of course, impossible to actually prove that they do; but that it is probable is evident from a consideration of the reports given of the directions in which "sleeping sickness" has spread, and by enumerating the numbers of places in which "sleeping sickness" is said to have appeared amongst residents after the deaths of imported cases.

The dates of the appearance of the first cases and frequently the names of the patients are unhesitatingly given in many places in the heavily infected area between Lokandu, Lusambo, Cabinda, Albertville and Baraka. At Cabinda, Miambwé and Tshofa "sleeping sickness" is always said to have commenced at and to have come from Pania Mutombo. At Lokandu it came from Nyangwé. The first case recognised in 1903 at Baraka was a labourer returned from Leopoldville. All the cases detected by gland palpation in 1905 at Yalembé, where "sleeping sickness" was thought not to exist, had been to Mopolengue as labourers. The first cases reported at Ilé, Luebo, Kutu, Mutombo Mukolo, Kabambare, Buli and Basoko, as well as at the posts marked by red dots or circles in as yet uninfected districts, were all imported.

As is shown by Maps I. and II., "sleeping sickness" has existed for many years along the Congo and Ubangi rivers.

Map I. indicates how frequently the disease is said to have existed "before the arrival of the whites." At Lukolela and Bamamia we received information equivalent to an assertion that the disease had been present in these localities for over 50 years.

It, nevertheless, seems certain that there has been a great increase in morbidity along these rivers within the past fifteen years. Europeans living at the following places at the period indicated have said, in evident error, that "sleeping sickness" was then unknown among the neighbouring natives; at Mopolengue in 1890, Bolengi in 1899, and at Nouvelle Anvers in 1895. Had the disease existed at these periods in anything like its present intensity it would seem impossible for them to have missed seeing cases. In addition, at many places both natives and Europeans join in saying that there has been in recent years a great increase in the number of cases. In many instances the approximate date is given, and it is often asserted that the increase has gradually travelled up river.

From the information we have received it is, however, impossible to decide if the epidemic raging on the upper river from 1890 onwards is an extension of the epidemic which existed on the Lower Congo in the eighties.

Gland Puncture.

An enlargement of the superficial lymph glands has long been recognised to occur in "sleeping sickness." Before the identity of "sleeping sickness" and trypanosomiasis was known, enlarged glands were described in several cases of human trypanosomiasis. Their presence was at first thought to be probably accidental and not characteristic; but the study of large numbers of patients in different parts of Africa soon showed that glandular enlargements were a constant feature of early cases of trypanosomiasis.

In 1904 Greig and Gray found that trypanosomes were usually present in the juice drawn by a hypodermic syringe from such glands. The line of work thus indicated was followed up, and in the Congo the following facts were demonstrated. Practically the same results have been obtained in Uganda by the Commission of the Royal Society and by Captain Grattan, R.A.M.C., in Sierra Leone (private letter):—

(1) It was found that trypanosomes could practically always be found in the glands of cases of trypanosomiasis. Our percentage of successful examinations in a consecutive series of 250 patients was 97.2 per cent. The method seems particularly good in detecting early cases in whom all clinical signs are wanting. We had 98.5 per cent. of successful examinations in a series of 130 consecutive early cases; *i.e.*, patients in whom there were no obvious clinical signs of their disease.

(2) (a) It was suspected that many of the apparently healthy natives possessing enlarged glands, which had been thought to be not abnormal in negroes, might really be early cases of trypanosomiasis. To decide this point natives were examined all along our route and we have concluded that every native who lives in an infected district and has a general glandular enlargement, without apparent cause, is almost certainly a case of trypanosomiasis, even though he seems entirely healthy.

Persons with apparent causes for their glandular enlargements as Tuberculosis, syphilis, skin and scalp disease have not been considered in compiling any of the figures in this paper referring to gland puncture. Such persons were however not infrequently infected (8 in 26 examined).

(b) A comparative study of the glands in 300 of our patients showed that the general glandular enlargement of cases of trypanosomiasis might be conveniently estimated by palpation of the posterior cervical triangles; 89.3 per cent. of the persons chosen because of their enlarged cervical glands from 3,538 apparently healthy natives, palpated between October, 1904, and July, 1905, were demonstrated to be cases of trypanosomiasis.

(3) To determine whether cervical glandular enlargements, without apparent cause, occurred in natives inhabiting districts uninfected by trypanosomiasis, 2,414 natives among whom "sleeping sickness" was said not to occur were palpated. Only 1.4 per cent. were found to have enlarged cervical glands.

Some of the villages examined, as Basoko and Yakusu, were only just outside the districts recognised as infected, and it was only in 834 natives from Lowa and Lake Kasali that we met persons from districts certainly uninfected. Three amongst these people had enlarged glands. All three were newcomers and had previously lived in infected localities.

The contrast between this figure and that from 1,405 natives from heavily infected districts, of whom 16.7 per cent. had much enlarged glands, is very striking. The logical conclusion resulting from these premises is apparent.

We have in cervical gland palpation a wonderfully simple and very accurate method of detecting, especially, those cases of trypanosomiasis in whom marked clinical signs are wanting.

It is believed that the first part of this paper proves that much of the extension of sleeping sickness in the Congo basin during recent years may be directly attributed to the disease being *carried* into uninfected districts by the migration of just such persons.

Prevention of Sleeping Sickness.

The lack of a rapid and efficient method of diagnosis has heretofore made it impossible to attempt any quarantine against "sleeping sickness." In cervical gland palpation we have a simple test which, even in the absence of a physician, may be accurately applied by an intelligent person. We believe that measures based on this fact may be usefully employed to safeguard uninfected districts against invasion by trypanosomiasis.

The gist of the measures which have been advised and are already being initiated in the Congo Free State are:—

(1) The establishment of posts of inspection along the main roads to prevent the entrance of infected persons into uninfected districts, and

(2) The removal of infected persons from posts in uninfected districts to places already infected.

The application of these measures will be obtained by informing every agent of the State of the significance of enlarged cervical glands. Each chief of a post will be directed to examine his staff and to send suspected persons towards infected regions to the nearest doctor, where, if it is necessary for diagnosis, the patient will be watched. Each white man will be made to understand the importance of preventing persons with enlarged glands from proceeding towards uninfected districts, and will be given authority to prevent their progress.

A reference to the maps will show how effectually the main routes of communication between infected and uninfected districts can be controlled in the Congo. The North-Eastern corner of the Free State is usually reached from the West by the Itimbiri and Aruwimi rivers. Physicians placed at, perhaps, Bumba and Ibembo, Basoko and Yambuya with full powers, could very effectually control all ordinary traffic. To the East the roads to the South of Lake Albert used now by Arabs for trading from Uganda into the Haut Ituri district, and formerly as a slave route, must also be watched.

Practically all communication from the Lower Congo to the district about

Lake Kivu passes by Uvira. A medical officer placed there could easily watch the road. Almost everything coming from the West destined for the South of the Free State passes through Cabinda. These examples will be sufficient to show that the first of our proposals can be applied in practice in so far as the ordinary traffic is concerned.

Some opposition will be necessarily encountered in enforcing these regulations. It is particularly certain that there will be much objection to the second. Trypanosomiasis is an exceedingly chronic disease. Infected persons may remain in apparent health and be perfectly capable of steady work for several years. Indeed, it is not at all certain that recoveries do not occur, and both employer and employed will resent any interference with their arrangements on the score of a few enlarged glands. Both must appreciate that this proposal does not mean the loss of a labourer, but merely his transference to an already infected district, where his presence will only add to and not create a centre of infection.

The futility of attempting to suddenly institute anything like an absolute quarantine in the network of paths in Africa, is, of course, quite apparent to us; but though the application of the scheme outlined may not immediately stop the spread of "sleeping sickness," we are confident that a strict supervision of travellers and of the soldiers and labourers about the Government's posts will do much to check its progress in the Congo Free State. At all events, it will no longer be possible for Europeans to introduce large numbers of infected labourers and soldiers into uninfected districts as has often been done in the past.

The following are a few additional instances in which large numbers of infected persons were brought into uninfected regions. Deaths occurred from "sleeping sickness" during the years from '89-92 among the Lower Congo soldiers stationed at Basoko. About 2,000 labourers, many of them coming from Maniema, the district about Kasongo, are at present working on the railroad which is being built from Stanley Falls to Ponthierville. Several recognised cases of "sleeping sickness" have occurred among them. The disease has remained unrecognised in other cases and they have been dismissed as "unfit for work." We found three such persons in the uninfected villages along the river between the Falls and Ponthierville. In a detachment of fifty labourers engaged near Lusambo to work as head men in a previously little-infected concession on the Kwango almost 20 per cent. were infected.

It may be once more pointed out that at each of the posts marked on these maps by large red dots imported cases of sleeping sickness have died in, at that time, non-infected districts.

A mission school was founded at Berghe Saint Marie in 1890; large numbers of children were collected there from many widespread districts. In 1895 "sleeping sickness" commenced, it was said to have reached the school from the neighbouring Bobangi people. The disease steadily increased until in 1898 there was a mortality from this cause of 39.9 per cent. among the 461 children then at the mission (1). It was decided to abandon the mission, and in 1900 the children still living were sent in all directions to other missions. Almost all subsequently died of "sleeping sickness." Many persons believe that much of the spread of the disease is directly due to this unfortunate occurrence. Though it is now apparent that this step was ill-advised, it seems probable that not as much harm followed as is usually imagined; since "sleeping sickness" already existed in the localities to which the main detachment of the unfortunate children were sent.

Such incidents will be prevented by the adoption of the scheme outlined. It will be more difficult to control the movements of individuals, but if Africans, white and black, learn to appreciate the importance of keeping infected persons out of uninfected districts, much can be done. Natives will soon learn that enlarged glands mean "sleeping sickness." They know it already in North-western Africa. The idea of quarantine is not altogether strange to them, since in many places in the Congo the natives of their own accord isolate their sick in huts built far away from the main village.

We have been told that one tribe in Maniema objected to natives from infected districts entering their territory lest "sleeping sickness" be introduced with them.

If the proposed measures are carried out with the usual thoroughness of the Congo Free State administration, we believe that much good will inevitably be done. The application of these measures will involve much expense and the alteration of much in the existing methods of transport and administration. Before attempting to enforce them executives must inquire exactly what result may be expected from them if they are efficiently applied and, if the result hoped for is attained, whether it will constitute an adequate recompense for the outlay it has necessitated. All that can be expected with certainty from a rigid quarantine such as is proposed, is that the advance of "sleeping sickness" towards districts at present uninfected will be checked, not stopped.

The known distribution of human trypanosomiasis in Africa is much less than the known distribution of the variety of *Glossina* which transmit the disease. We must suppose from our present knowledge that in the ordinary course of events trypanosomiasis would eventually spread into every district where the fly exists. Our proposal expresses a belief that the hundreds of thousands of natives living in such regions, at present uninfected, may be protected for a lengthy period from the danger threatening them. (It must be remembered that while "sleeping sickness" may be quickly *carried* from place to place, it *spreads* but slowly from an infected centre.)

Whether the effort to realise this benefit is worth while can best be appreciated by considering what has been the results of the recent epidemics of the disease in Uganda and the Congo Free State. It is quite impossible to state accurately the number of persons who have died from trypanosomiasis in the territories of these governments. Complete censuses do not exist. In much infected localities deaths are often ascribed to "sleeping sickness" which in reality are due to other diseases. (On the other hand, the disease is often present for some time before its presence is recognised.) It is impossible to keep track of tribes or smaller collections of natives who have left their old

homes to avoid the disease. It is, however, certain that populous districts have become almost deserted within a few years and that a large proportion of the deaths were certainly due to "sleeping sickness." The figures usually given for the numbers of deaths from trypanosomiasis during the past ten years in Uganda and the Congo are so colossal that we shrink from repeating them. Because of the following observation we, nevertheless, believe that they approximate the truth. It was found that from 30 per cent. to 50 per cent. of the population was infected in many of the villages along the route we followed between Lokandu and Cabinda. It is generally accepted that only a very small percentage of persons infected with trypanosomes can be expected to "recover." Therefore, at least *a third of the people inhabiting these districts will probably die of trypanosomiasis.*

It seems advisable that the utmost should be done to protect uninfected districts from a like fate.

Our conclusions are:—

(1) The enormous spread and great increase of "sleeping sickness" in the Congo basin during recent years has been due, in a great measure, to the increase in travel following the opening of the country.

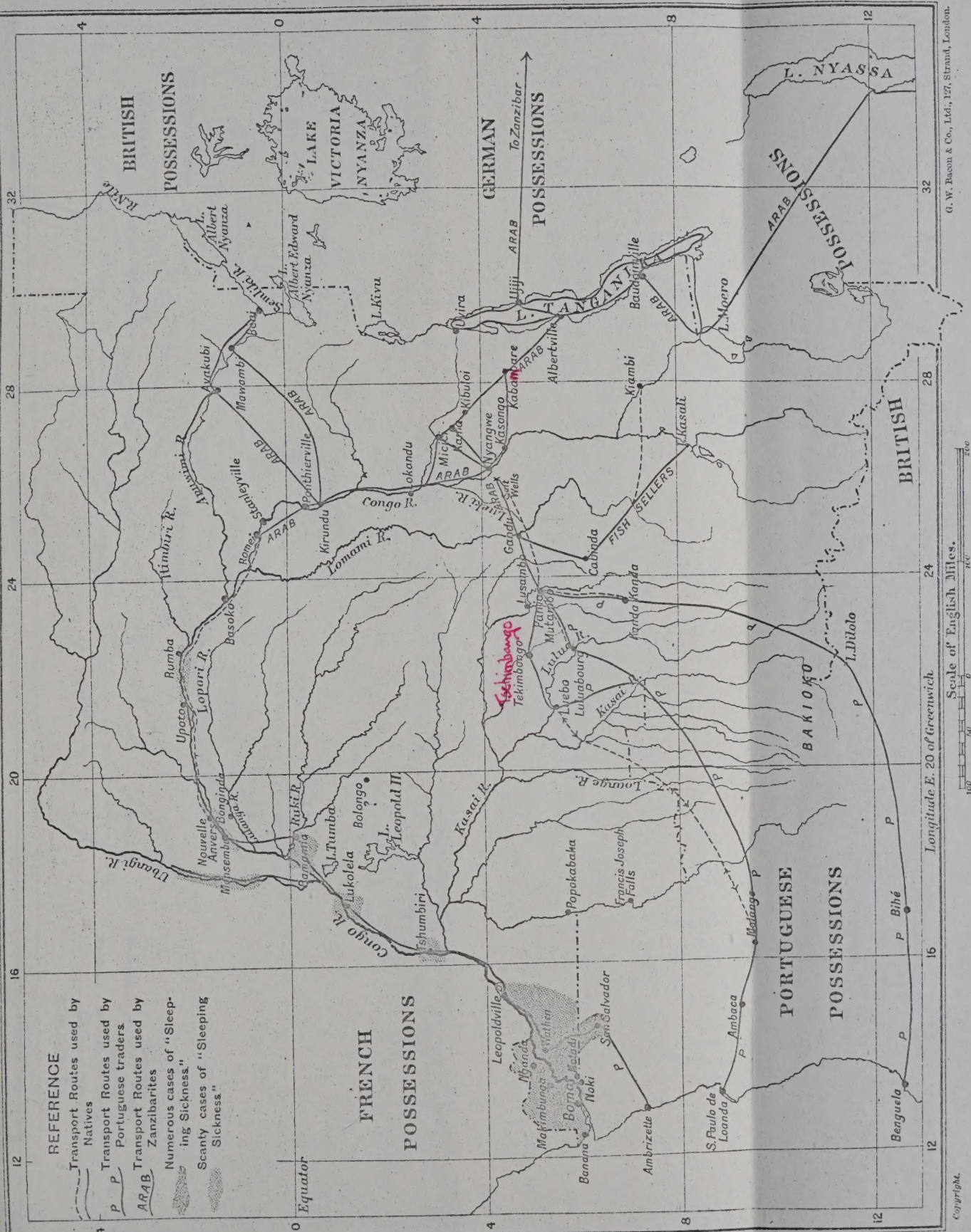
(2) Cases of trypanosomiasis, though apparently healthy may be detected by their enlarged glands.

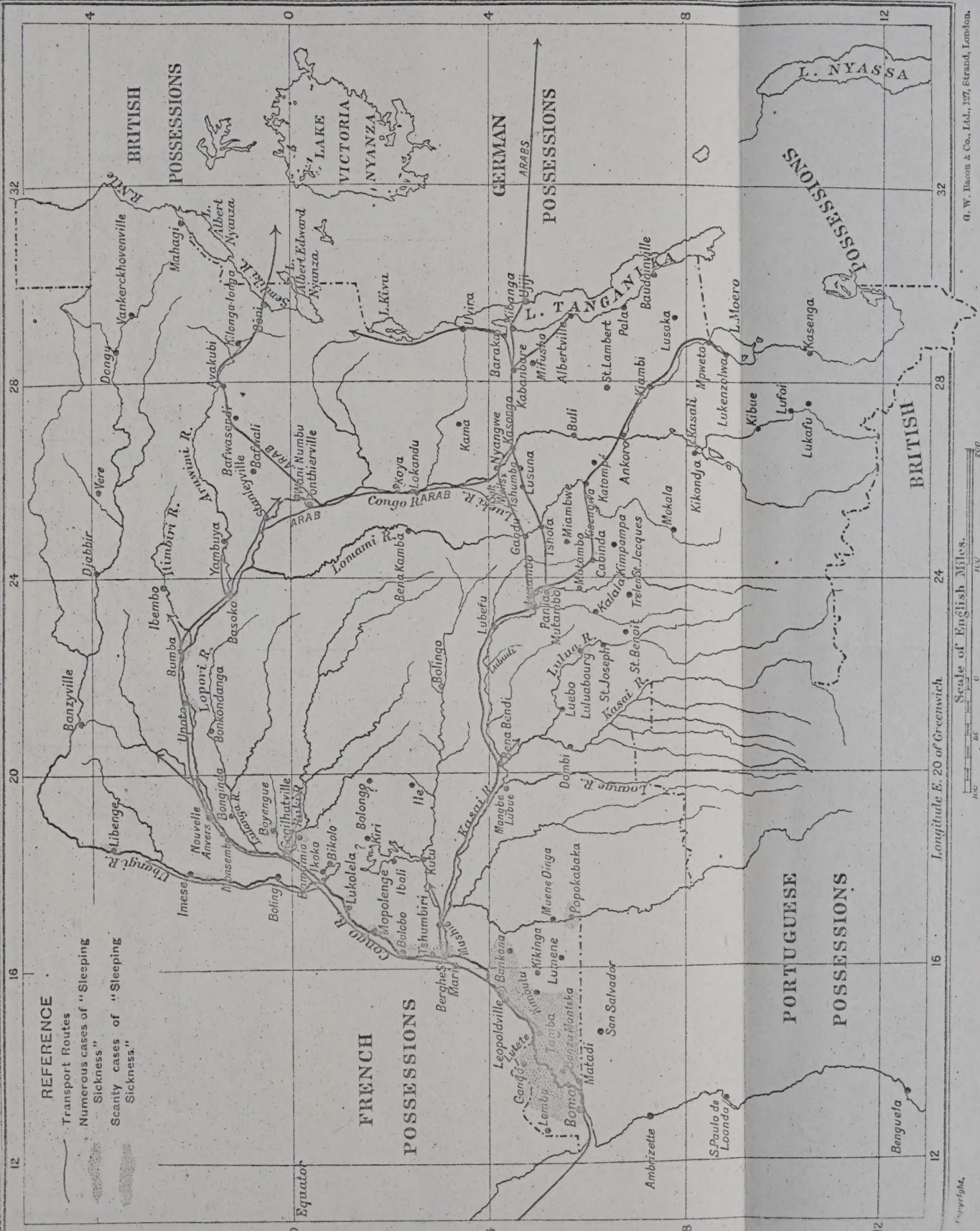
(3) Good results may be expected from the serious application of quarantine measures dependent for their efficiency upon cervical gland palpation.

REFERENCE.

1. Van Campenhaut and Dryepondt. Rapport du laboratoire medical de Leopoldville, 1899-1900, Brussels, 1901.



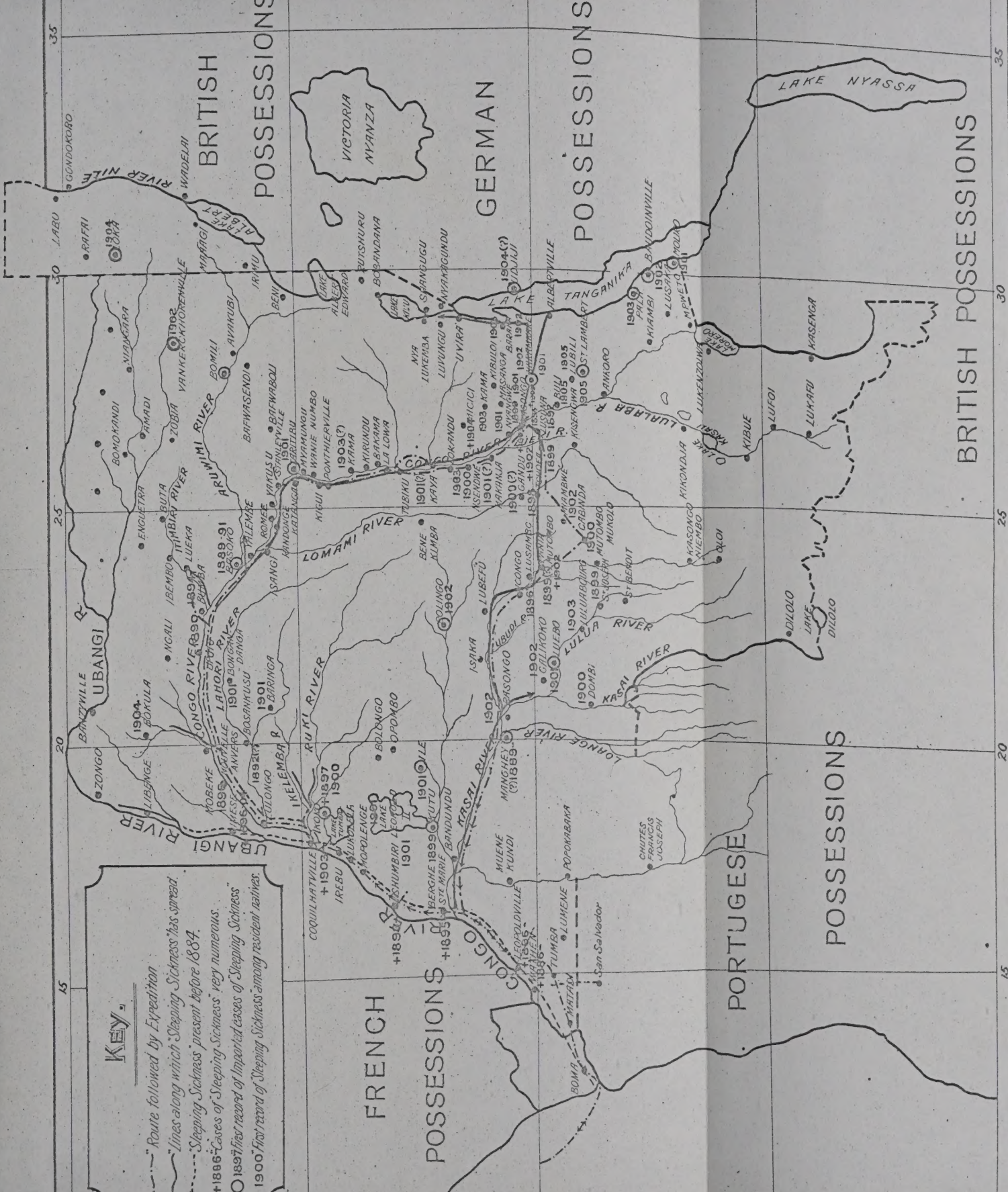






KEY.

- Route followed by Expedition
- Lines along which Sleeping Sickness has spread
- Sleeping Sickness present before 1884
- +1886 Cases of Sleeping Sickness very numerous
- 1897 first record of imported cases of Sleeping Sickness
- 1900 first record of Sleeping Sickness among resident natives.



MAP IV

The advance of "Sleeping Sickness" in the Congo Free State.

